

PATENT CLAIMS

1. Hydraulic control system (1) for construction vehicle, particularly for the control of hydraulic loads (18) of an excavator, having at least one main control block (2) forming several sections (3) with spool valves (19) located therein, a hydraulic fluid tank (4) and two pump ducts P01(17.1) and P02 (17.2) to which pressure may be applied by means of a first pump (5.1) and a second pump (5.2) for the supply of hydraulic fluid to the hydraulic loads (18) in series through the spool valves (19), **characterised in that** two further pump ducts P1 (17.3) and P2 (17.4) are provided, which extend in the direction of the longitudinal axis of the main control block (2) parallel to the pump ducts P01 (17.1) and P02 (17.2) and which are designed to ensure an additional parallel supply to the hydraulic loads (18) by means of the spool valves (3).
2. Hydraulic control system (1) for construction vehicle in accordance with claim 1, **characterised in that** the pump ducts P01 (17.1) and P1 (17.3) are designed so that pressure can be applied to them by the first pump (5.1) and pump ducts P02 (17.2) and P2 (17.4) are designed so that pressure can be applied to them by the second pump (5.2).
3. Hydraulic control system (1) for construction vehicle in accordance with claims 1 or 2, **characterised in that** the sections (3) have a first bypass duct (6.1) and, if applicable, a second bypass duct (6.2), the first bypass duct (6.1) being supplied with hydraulic fluid by means of the pump ducts P01 (17.1) and P02 (17.2) and the second bypass duct (6.2) by the additional pump ducts P1 (17.3) and P2 (17.4).
4. Hydraulic control system (1) for construction vehicle in accordance with one of claims 1 to 3, **characterised in that** the first bypass duct (6.1) and the second bypass duct (6.2) are linked together hydraulically, thereby forming a ring bypass (6).
5. Hydraulic control system (1) for construction vehicle in accordance with one of claims 1 to 4, **characterised in that** the main control block (2) is designed to be extendable in the direction of its longitudinal extension by means of options blocks (11) to expand the function of the hydraulic control system (1), whereby said options blocks (11) are designed so that they are hydraulically linked to the existing pump ducts P01 (17.1) and P02 (17.2) and to the additional pump

ducts P1 (17.3) and P2 (17.4), and so that the options blocks (11) have the same duct structure as the main control block (2).

6. Hydraulic control system (1) for construction vehicle in accordance with one of claims 1 to 5, **characterised in that** the options block (11) is an automatic overflow valve (13), embodied in such a way that the volumetric current of hydraulic fluid provided by the second pump (5.2) through pump duct P2 (17.4) which is not required by a hydraulic load (18) is made available to pump duct P02 (13).
7. Hydraulic control system (1) for construction vehicle in accordance with one of claims 1 to 6, **characterised in that** the main control block (2) has a terminating element (14) at at least one end, in which pump duct P02 (17.2) and pump duct P2 (17.4) are hydraulically connected to each other.
8. Hydraulic control system (1) for construction vehicle in accordance with claim 7, **characterised in that** the terminating element (14) has a controllable summing valve (15) which is designed in such a way that a combination of the volumetric currents flowing in pump ducts P1 (17.3) and P2 (17.4) is ensured if necessary, to feed this combined volumetric current to a single hydraulic load (18).
9. Hydraulic control system (1) for construction vehicle in accordance with one of claims 1 to 8, **characterised in that** the main control block (2) has a controllable hammer valve (12) with an appropriate pilot stage (12.2) and a pilot pressure tapping aperture (12.1), which is designed so that hydraulic fluid flowing back from a hydraulic hammer attachment is fed directly into the hydraulic fluid tank (4) under hardly any pressure.
10. Hydraulic control system (1) for construction vehicle in accordance with claim 9, **characterised in that** the hammer valve (12) is usefully designed to operate the hydraulic hammer attachment either by means of the spool valve (19) of section 6 or by means of a spool valve (19) in the options blocks (11).
11. Hydraulic control system (1) for construction vehicle in accordance with one of claims 1 to 10 **characterised in that** the section (3) in the vicinity of the second bypass duct (6.2) has a choke (7) and a blind plug (8), said choke (7) being designed so that the spool valve (19) is supplied with hydraulic fluid by means of the volumetric current provided through pump duct P1 (17.3) and the blind plug (8) being designed to seal the connection between the pump duct P2 (17.4) and the spool valve (19) hydraulically.
12. Hydraulic control system (1) in accordance with one of claims 1 to 11, **characterised in that** the options block (11) has a controllable pressure compensator (9) which connects the pump duct P2 (17.4) and the second bypass (5.2) with

each other, the pressure compensator (9) being designed to supply an additional hydraulic load (18) with a desired volumetric current of hydraulic fluid at a desired pressure, independently of the load pressure.

13. Hydraulic control system (1) for construction vehicle in accordance with claim 12, **characterised in that** the sections (3) have a one-way restrictor (7) and/or a blind plug (8) and/or a pressure compensator (9) and/or further hydraulic control elements.